The Jupiter Gravity and Magnetics Mission: Probing Jupiter's Internal Structure and Processes

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The Jupiter Gravity and Magnetics Mission would use gravity field measurements from Radio Science Celestial Mechanics (CM) experiments, magnetic field measurements by a Scalar/Vector Helium Magnetometer, and Radio Science Atmospheric Occultations to probe Jupiter's interior and tropospheric structure and interior processes. In addition to probing Jupiter's interior structure, the CM investigation is sensitive to the tropospheric zone-belt structure's penetration depth, a question emphasized by recent results from the Galileo atmospheric probe. Payload simplicity, low data rates, and low power requirements permit use of a simple, lightweight, solar powered spacecraft that can be launched directly to Jupiter on a Delta II 7925, well within Discovery Program constraints. The spacecraft's orbit takes it to 1000 km above the equatorial tropopause, and out to 20-25 Rj at apojove. Inclining the orbit at 64Ì provides good latitudinal coverage, maintains a near- equatorial line of apsides, avoids the ring hazard, keeps the spacecraft out of the worst part of the jovian radiation belts, and precesses the orbit to provide the best possible mix of CM and Occultation measurements. The Jupiter Gravity and Magnetics Mission would pioneer Discovery Program exploration of the outer solar system. This work was performed at the Jet Propulsion Laboratory/California Institute of Technology under contract to the National Aeronautics and Space Administration.

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